MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2022/2023 (TERM ID 2240)

ETM7186 - ADVANCED NETWORK ARCHITECTURES AND PROTOCOLS

M. Eng. Telecommunications

10 FEB 2023
09:30 AM – 12:30 PM
(3 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 3 pages (including this cover page) with 4 Questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the Answer Booklet provided.

Question 1

(a) What is the difference between hot-potato and cold-potato routings? Use an example in your explanation.

[10 marks]

(b) Differentiate between intra-AS and inter-AS routings.

[10 marks]

(c) Explain the process of Reverse Path Forwarding (RPF).

[5 marks]

Question 2

(a) How do we ensure that data transfer is reliable using ACK, NAK, packet sequence number, and timeout? Present your answer by explaining the followings:

(i) Meaning of reliable data transfer (RDT) [3 marks]
(ii) RDT process [3 marks]
(iii) Method of dealing with bit errors [3 marks]
(iv) Method of dealing with duplicate packets [3 marks]
(v) Method of dealing with compromised ACK/NAK [3 marks]

(b) With the aid of an illustration, explain how TCP CUBIC outperforms its predecessors.

[10 marks]

Question 3

(a) More often than not, Quality of Service (QoS) are expected in the Internet today. Imagine you are the chief architect of the Internet. You introduce the concept of QoS to improve the quality of Internet service delivery. What are the four guiding principles behind your design of the QoS? Explain each of them.

[8 marks]

(b) When multiple packets are to be sent out, you need to schedule their respective turns. Describe the following four types of scheduling with illustrations.

(i) First Come, First Served (FCFS) [2 marks]
(ii) Priority scheduling [5 marks]
(iii) Round Robin [5 marks]
(iv) Weighted Fair Queueing (WFQ) [2 marks]

(c) What is the purpose of marking a packet?

[3 marks]

Question 4

(a) (i) Explain the three main problems faced by the current Internet architecture in the aspect of traffic engineering. Give a summary to them.

[8 marks]

(ii) How does Software-Defined Networking (SDN) enhance the Internet traffic engineering?

[6 marks]

(b) (i) Why are the control and data planes separated in the Long-Term Evolution (LTE) network? Describe the separation with illustrations on the important components of control and data planes.

[8 marks]

(ii) Briefly explain the tunneling in data plane (the protocol and system components that are involved, and the process).

[3 marks]

End of Paper